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In the Supreme Court

OF THE

United States

OCTOBER TERM, 1980

SIDNEY A. DIAMOND, COMMISSIONER OF PATENTS AND TRADEMARKS,
Petitioner,

VS.

JAMES R. DIEHR, II, AND THEODORE A. LUTTON,
Respondents.

On Writ of Certiorari to the United States Court of Customs and Patent Appeals

BRIEF FOR RESPONDENTS

Of Counsel:
ROBERT F. HESS
SOUTHFIELD, MICHIGAN

JAY M. CANTOR
WASHINGTON, D.C.

THOMAS M. FREIBURGER
ROBERTA L. CAIRNEY
DAVID A. LOWIN
OWEN, WICKERSHAM & ERICKSON P.C.

ROBERT E. WICKERSHAM
OWEN, WICKERSHAM & ERICKSON, P.C.
433 CALIFORNIA STREET, 11TH FLOOR
SAN FRANCISCO, CA 94104
(415) 781-6361
Counsel for Respondents

BOWNE-PERNAU WALSH • 1045 SANSOME ST. • S.F., CA 94111 • (415) 981-7682

QUESTION PRESENTED FOR REVIEW

The "Question Presented" by Petitioner is not even involved in this case. It is far from what is involved, and is so inaccurate and so improper that it becomes necessary to present the following counterstatement, which is substantially what the CCPA found[1] to be the question presented:

> Does a patent process claim drawn to subject matter which is otherwise statutory under 35 U.S.C. § 101 become non-statutory merely because a computer is involved in execution of a portion of the process?

As specifically applied to the facts herein, the issue becomes:

> Does a claim to a novel physical and chemical process for molding precision rubber products, normally considered to be patentable subject matter within the terms of 35 U.S.C. § 101, become unpatentable because some of the novel steps used to determine the time when cure is complete and to trigger the opening of the mold at precisely the proper time, involve, *inter alia,* the use of a programmed computer?

Parties to the Proceeding in the Court of Customs and Patent Appeals

The caption shows all the parties. However, the patent application forming the basis of this case was assigned by the inventors to Federal-Mogul Corporation of Southfield, Michigan. The inventors, Messrs. Diehr and Lutton, are employees of Federal-Mogul Corporation.

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[1]Petitioner's Appendix (Pet. App.), p. 7a.

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On Writ of Certiorari to the United States Court of Customs and Patent Appeals

RESPONDENTS' BRIEF ON THE MERITS

CITATIONS TO THE OPINIONS BELOW

The opinion of the Court of Customs and Patent Appeals (App. A to Petition, p.1a) is reported at 602 F.2d 982 and at 203 USPQ 44. The unreported opinions of the Patent and Trademark Office Board of Appeals and of the patent examiner are reprinted in the Appendix to the Petition at Appendices C, p.20a and D, p.26a respectively.

JURISDICTION

Certiorari was granted on March 17, 1980, jurisdiction having been invoked under 28 U.S.C. 1256.

STATUTE INVOLVED

The sole statute involved is 35 U.S.C. § 101, which reads:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

STATEMENT OF FACTS

The patent application at issue

The patent application at issue was filed on August 6, 1975 by James R. Diehr, II and Theodore A. Lutton. This application, Serial No. 602,463, is a continuation of application Serial No. 472,595 that was filed on May 23, 1974, which in turn was a continuation-in-part of application Serial No. 401,127 filed on September 26, 1973.[2] At issue in this case are the eleven claims in the latest-filed application.[3]

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[2]The invention is assigned to Federal-Mogul Corporation, Detroit, Michigan.

[3]All eleven claims are printed in the Appendix to the Petition (Pet. App.) at pages 57a to 62a. Three examples are claims 1, 2, and 11:

> 1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:
>
> providing said computer with a data base for said press including at least,
>
> natural logarithm conversion data (ln),
>
> the activation enegry constant (C) unique to each batch of said compound being molded, and
>
> a constant (x) dependent upon the geometry of the particular mold of the press,
>
> initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,

The nature and significance of the invention

The invention is a process for molding raw, uncured synthetic rubber into cured precision products. The process uses a mold for precisely shaping the uncured material under heat and pressure and then curing the synthetic rubber in the mold, so that the product will retain its shape and be functionally operative after the molding is completed.

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constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,

constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is

$$\ln v = C Z + x$$

where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and

opening the press automatically when a said comparison indicates equivalence.

2. The method of claim 1 including measuring the activation energy constant for the compound being molded in the press with a rheometer and automatically updating said data base within the computer in the event of changes in the compound being molded in said press as measured by said rheometer.

11. A method of manufacturing precision molded articles from selected synthetic rubber compounds in an openable rubber molding press having at least one heated precision mold, comprising:

(a) heating said mold to a temperature range approximating a predetermined rubber curing temperature,

(b) installing prepared unmolded synthetic rubber of a known compound in a molding cavity of a predetermined geometry as defined by said mold,

The claimed technology is chemical and mechanical, not mathematical. Messrs. Diehr and Lutton do not attempt to patent an algorithm, an equation, any form of mathematics, or any means, computer included, of performing calculations.

Federal-Mogul Corporation, the assignee of the invention, does not manufacture computers, nor does it engage in

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(c) closing said press to mold said rubber to occupy said cavity in conformance with the contour of said mold and to cure said rubber by transfer of heat thereto from said mold,

(d) initiating an interval timer upon the closure of said press for monitoring the elapsed time of said closure,

(e) heating said mold during said closure to maintain the temperature thereof within said range approximating said rubber curing temperature,

(f) constantly determining the temperature of said mold at a location closely adjacent said cavity thereof throughout closure of said press,

(g) repetitively calculating at frequent periodic intervals throughout closure of said press the Arrhenius equation for reaction time of said rubber to determine total required cure time v as follows:

$$\ln v = cz + x$$

wherein c is an activation energy constant determined for said rubber being molded and cured in said press, z is the temperature of said mold at the time of each calculation of said Arrhenius equation, and x is a constant which is a function of said predetermined geometry of said mold,

(h) for each repetition of calculation of said Arrhenius equation herein, comparing the resultant calculated total required cure time with the monitored elapsed time measured by said interval timer,

(i) opening said press when a said comparison of calculated total required cure time and monitored elapsed time indicates equivalence, and

(j) removing from said mold the resultant precision molded and cured rubber article.

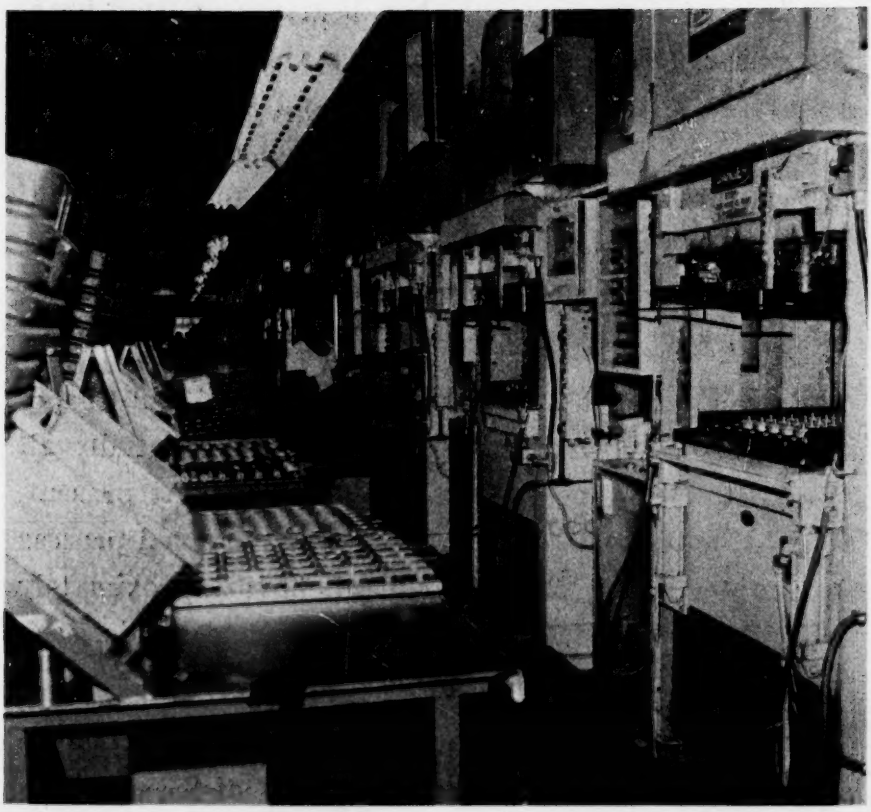
the sale of computer programs. It manufactures metal bearings (tapered roller bearings, ball bearings, journal bearings), and synthetic rubber shaft seals. Most of its shaft seals are sold to automobile, truck, and farm equipment manufacturers, to vendors of replacement parts for automobiles, trucks, and farm equipment, and to other manufacturers of bearings. The seals made by this invention prevent leakage of oil from engines, transmissions, axles, and bearings.

The invention is actually used by Federal-Mogul Corporation in its own plants to manufacture substantially all of its synthetic rubber oil seals and O-rings. At present, Federal-Mogul has four plants where the claimed process is in continuous use. These four plants have approximately two hundred presses and about ten thousand molds, each using the claimed process.

Two recent photographs are reproduced here just to help the Court visualize the general nature of the precision molding process and to save detailed description.

Each year Federal-Mogul uses the claimed process to mold about six million pounds of synthetic rubber. The total sales proceeds from products made by the claimed process since late 1973 are more than $400,000,000.00. None of this money came from the sale or license of a computer program.

Federal-Mogul estimates that the manufacturing process claimed in the claims at issue has saved it at least $25,000,000.00 over the past six years, as compared with the cost of manufacture by the prior-art processes it displaced.



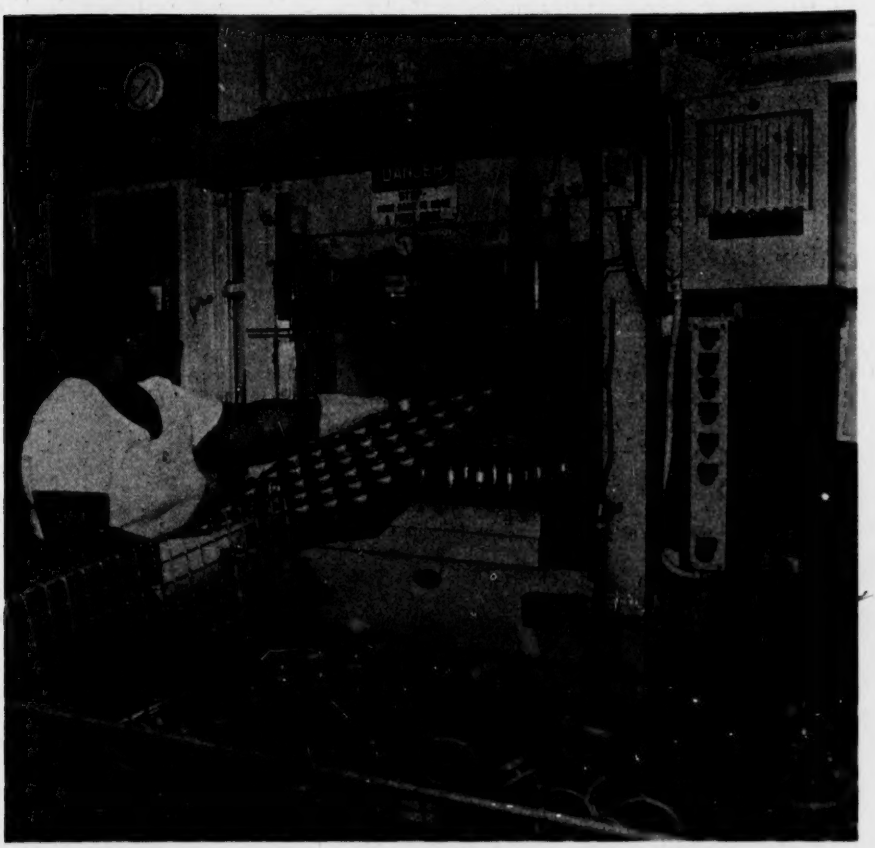
A series of presses practicing this rubber-molding invention at Federal-Mogul's plant in Summerton, South Carolina.

In addition, the claimed process has increased productivity by about *twenty percent,* by eliminating over-curing. That is, the same molds can make 20% more products of even higher quality in a given amount of time, because the present process saves time that was formerly wasted in over-curing the products.

Federal-Mogul's precision molded oil seals have been improved by this process, and the public has been benefited by less expensive and higher quality products.

About cure

The invention enables a more accurate cure of the molded elastomer or synthetic rubber. Before being molded, the elastomers used in this process are chemical compounds of a type known as polymers. They are made up of very large molecules which consist essentially of recurring long-chain structural units, the units being relatively simple chemically. These recurring long chains impart the elasticity, tensile strength, deformability, and hardness found in both natural and synthetic rubber.



A press operator in the same plant loading one of the presses that molds and cures the synthetic rubber sealing elements and bonds them to metal cases, transforming raw material into oil seals in about 2 to 2½ minutes. The foreground shows oil seals that have just been molded in that press.

Natural rubber had few uses until Charles Goodyear discovered and patented the process he called "vulcanization", now usually referred to as "cure". He discovered that an apparent accident had drastically changed—and improved—the rubber latex. His subsequent investigations led to his Patent No. 3633 and to a new industry. It was many decades, however, before chemists were able to define more clearly what had happened *chemically* to convert the tacky plastic mixture of rubber latex and sulfur to an elastic, nearly rigid product. The chemistry and production techniques are somewhat different with many synthetic rubbers, involving in many instances a phenomenon known as "cross-linking", in which chains of one chemical unit join together chains of a second chemical unit.

This chemical technology is what is involved in the claimed process. "Cure" is obtained by mixing curing agents into the uncured polymer in advance of molding, and then applying heat over a period of time. When the synthetic rubber is cured for the right length of time, at the right temperatures, it becomes a satisfactory product. When it is not cured long enough or is not hot enough during cure, the product is wholly unsatisfactory and must be rejected. Where the product is overcured there is deterioration in the quality of the product and the press is needlessly tied up, so that production is reduced.

Before the present invention, the industry could not uniformly obtain accurate cure. Sometimes the product came out of the mold so undercured that it had to be discarded. To avoid this disaster, the general practice was to deliberately attempt overcure, at the expense of production and some product quality.

How unavoidable temperature variations affect cure

In all processes involving cure of synthetic rubber, the cure time must be determined. The time needed to obtain a good cure depends in part on the temperature inside the press,[4] which is roughly regulated by a thermostat. Typical cure times at Federal-Mogul are about 2 to 2½ minutes. It is possible, using well-known time, temperature, and cure relationships, to calculate by means of an old well-known equation[5] when to open the press and remove the cured product. Nonetheless, uncontrolled variables present in the actual process make it difficult or impossible to postulate a single temperature from which such computations would produce a satisfactory result.

While the press is open for loading, it cools. The longer it is open, the cooler it becomes and the longer it takes to re-heat the press to the desired temperature range. Thus, the time necessary to raise the mold temperature to curing temperature is an important and unpredictable variable.[6]

Another cause of cure inaccuracy is the way thermostats work. Thermostats do not maintain a precise actual temperature; they turn on the heater when the temperature falls below a certain temperature range and turn off the heater

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[4]The geometric configuration of the press and the viscosity of the rubber when it enters the press are also important factors in computing the cure time. Pet. App. E, pp. 46a-49a.

[5]The equation is known as the Arrhenius equation, after its discoverer Svante Arrhenius (1859-1927) who received the Nobel prize for chemistry in 1903.

[6]Pet. App. E, p. 39a.

when the temperature rises above that range.[7] Control by thermostats alone is insufficient to insure that the desired or *nominal* temperature is actually maintained as the *average* temperature, and the average temperature is rarely, if ever, the nominal temperature. Hence, the prior-art calculations of proper cure time were based on guesswork and could not be accurate. The conventional practice of erring on the side of caution usually led to overcuring the rubber, while keeping the mold open longer than usual during unloading and reloading often resulted in undercuring.[8]

Although Diehr and Lutton use thermostats for rough control of the temperature range, they also provide for measuring the *actual* temperature in the closed press through use of a thermocouple and for doing so *continuously*. Every few seconds the *actual temperature measurements* are automatically fed into a digital computer to enable rapid calculation.[9] For each new measurement the computer recalculates the needed cure time, using the well-known Arrhenius equation. When the recalculated cure time equals the actual elapsed time since the press was closed, the computer signals a device which then opens the press.[10]

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[7]Mold thermostats are usually actuated by a change of plus or minus 2% for a desired or *nominal* temperature. Thus, if the desired or nominal cure temperature is 300° the range would be 294° to 306°—a twelve degree range. This means that the mold, when closed, would be heated until it exceeded 306°; then it would not be heated again until the temperature fell below 294°.

[8]Pet. App. E, p. 40a.

[9]*Ibid.*, pp. 41a, 45a.

[10]*Ibid.*, pp. 42a, 45a, 46a.

Prosecution in the U.S. Patent and Trademark Office

The invention's history in the Patent and Trademark Office was irrelevant to the hearing before the Board of Appeals and to the hearing before the Court of Customs and Patent Appeals. However, Commissioner Diamond's brief before this Court has raised certain points which, though respondents consider them irrelevant, are asserted by Diamond's brief to be important. These relate to the relevance of the Gould patent, the Davis patent, and other prior art. In that connection the progress of the applications through the Patent and Trademark Office needs to be considered, and the following tabulation summarizes the stages of prosecution:

CHRONOLOGICAL TABLE
OF PATENT OFFICE PROCEEDINGS

Applicants	Examiner
1. Original application SN 401,127 filed September 26, 1973. Did not include Figs. 3A and 3B or the Arrhenius equation. Two claims presented. (See Appendix A, p. A-1).	2. Rejection January 24, 1974 a) § 112 (insufficient disclosure because no computer program disclosed) b) § 112 (confusing wording in claim 2) c) § 103 (obvious in view of prior art pertaining to Neugroschl) d) § 101 (non-statutory subject matter) (See Appendix B, p. A-3).
3. Continuation-in-part application SN 472,595, filed May 23, 1974. Figs. 3A and 3B and Arrhenius equation added. Five claims presented. (See Appendix C, p. A-5).	

4. Rejection December 17, 1974
   a) § 112—(insufficient disclosure)
   b) § 103—(citing Neugroschl in view of Gould et al.)
   c) § 103 (citing Smith)
   d) § 101—as before
   (See Appendix A, p. A-7).

5. Amended application March 13, 1975. Claims revised; added a sixth claim. All points argued; three affidavits provided, one under Patent Rule 131 to remove Smith as reference. (See Appendix E, p. A-10).

6. Final rejection May 13, 1975
   a) § 112 as before
   b) § 101 as before
   Rejection under §103 not repeated.

7. Present Continuation Application SN 602,463 filed August 6, 1975. No new matter, but presented 10 claims. Previous affidavits resubmitted with preliminary amendment arguing all points. (See Appendix F, p. A-16).

8. Rejection January 26, 1976 applying only § 112 and § 101 both as before. Stated "Patents A-E are cited of interest but are not applied against the claims." (See Pet. App. 26a-30a, repeated 31a-34a).

9. Interview with examiner March 24, 1976.

10. Amended application April 21, 1976. Added claim 11 and submitted 2nd affidavit of Ekland. (See Appendix G, p. A-17).

11. Final rejection July 8, 1976. Applied *only* § 101. (See Pet. App. 35a-37a).

12. Brief for PTO Board of Appeals, October 21, 1976 Argued § 101 rejection only. Noted that § 103 rejections were withdrawn. (See Appendix H, p. A-18).

13. Examiner's Answer February 23, 1977 Argued only § 101 rejection. Stated: *"No references have been relied on."* (See Appendix I, p. A-19).

14. Board of Appeals Decision August 18, 1978.

15. Appeal to CCPA November 27, 1978. Only on § 101 rejection.

16. Decision of CCPA August 9, 1979.

As the chronological table shows, the examiner withdrew all rejections based on prior art during the pendency of the second application, and he *never* repeated them during the pendency of the present application.[11]

The Examiner's Final Rejection in this Case

The patent examiner finally rejected the invention on the *sole* ground that it was drawn to nonstatutory subject

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[11]Applicants' arguments before the Examiner were successful in overcoming a rejection under § 103 on the combination of references Neugroschl and Gould et al. These are their arguments:

Gould et al. were concerned with certain tire curing situations allowing the insertion of a thermocouple probe directly into a tire undergoing cure in the press. Apparently Gould et al. felt that in the cure of articles of the size and relative crudeness of tires, the deformities of the tires caused by insertion of the thermocouple was offset by a claimed increased accuracy of temperature readings. The Gould method is entirely unworkable in curing "precision molded compounds" which are the workpieces of the method of the present invention, and applicants' claims exclude Gould's use of a probe that projects into the article, calling for "constantly determining the temperature (Z) of the mold at a location closely adjacent to mold cavity."

Gould is further distinguished in that Gould relied on an analog computer to calculate cure in terms of "cure units," each cure unit being defined as the cure obtained at a given temperature for *one minute* (Gould, claim 1). The present invention provides a much more accurate calculation of cure time by *repeatedly recalculating* the Arrhenius equation "at frequent intervals during each cure" (See applicants' claim 1). As is well known in the art, modern computers are able to calculate a program cycle of the types specified by Fig. 3 of the present invention in an amount of time typically in the order of one second (See applicants' claim 6). Thus, the present invention further patentably distinguishes over Gould. See appendix herein, pp. A-11, A-12.

matter under 35 U.S.C. 101.[12] In his earlier rejections he had contended that those steps in the Diehr and Lutton claims that are "carried out by the computer under control of a stored program" are nonstatutory under *Gottschalk v. Benson,* 409 U.S. 63 (1972).[13] He contended throughout the prosecution that the "physical" steps in the process were conventional.[14] Diehr and Lutton did not agree with that nor with his overall conclusion and appealed.

The Board of Appeals

The Patent and Trademark Office Board of Appeals (the Board) unanimously affirmed the rejection.

The Board correctly found that the specification, while not containing a computer program as such, did contain a "sufficient" description from which a "person of ordinary skill in the art" could write a computer program.[15]

However, the Board then mistakenly stated that the step of "constantly determining the temperature (Z) of the mold . . ." appeared "to be within the prior art as described in 'Background of the Invention', specification pages 1-3."[16] Actually, these pages[17] refer to the use of *thermostats* as

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[12]Pet. App. D, pp. 36a, 37a. As the table, *supra,* shows, the patent examiner had rejected the parent case under Sections 103 and 112 as well as Section 101. In the present case he first rejected the case under Section 112 as well as Section 101. Due to prosecution, the examiner was apparently satisfied as to all issues except as to Section 101.

[13]Pet. App. D, pp. 28a, 33a, 34a.

[14]*Ibid.*, pp. 36a, 37a.

[15]Pet. App. C, pp. 21a, 22a.

[16]*Ibid.*, p. 22a.

[17]Pet. App. E, pp. 39a-41a.

being old, and do not refer to the steps of constantly *determining* (as by a thermocouple) the *actual* temperature. The Board missed this vital difference.

The Board, confusing the use of a thermostat with the *continuous measurement of actual* temperatures, and considering the claims step by step rather than as a whole, then stated:

> It is our view that the only difference between the conventional methods of operating a molding press and that claimed in applicants' application rests in those steps of the claims which relate to the calculation incident to the solution of the mathematical problem or formula used to control the mold heater and the automatic opening of the press.[18]

The Board held that this calculation was respondents' "contribution" and was "a computer program of the character" that is nonstatutory under *Gottschalk v. Benson, supra,* 409 U.S. 63, and *Parker v. Flook,* 437 U.S. 584 (1978).[19]

The Court of Customs and Patent Appeals (CCPA) reversed in a unanimous decision.

SUMMARY OF ARGUMENT

The term "computer program"—a term ill-defined in the Commissioner's brief—should not be a shibboleth to decide the outcome of this case or of others like it. Instead, the case requires careful study of the law regarding processes which include some steps that are physical and chemical

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[18]Pet. App. C, p. 24a.

[19]*Idem.*

and some steps that involve calculation. Hence, the "Question Presented" by this case should be accurately defined. The Commissioner's stated Question is not posed by the case and answering it would not decide the case. The Question as phrased by Respondents is an accurate one and answering it decides this case.

A rubber-molding process is subject matter that is well known to be statutory under 35 U.S.C. § 101. Involving a computer and its calculations in the claimed process does not remove the process from its statutory category.

Unlike the claims in *Parker v. Flook*, the present claims are true process claims; they are directed to the molding and curing of synthetic rubber. They do not recite and are not directed to a computer program. They are not intended to claim and do not claim a computer program or a calculation *per se* or a mathematical formula *per se*. The invention employs a programmed computer to refine certain steps where rapid repetitive calculation is combined with constant temperature monitoring in order to replace guesswork cure times with accurate cure times. The claimed process converts an uncured synthetic rubber mass, useless in itself, into a highly useful precision product such as a lip-type shaft seal or oil seal. The claims meet the standards required of process claims, claim no more than the inventive process, and do not attempt to monopolize any mathematical algorithm.

The Court of Customs and Patent Appeals carefully studied and correctly applied *Gottschalk v. Benson* and *Parker v. Flook;* its opinion is sound and worthy of complete affirmance. The CCPA swept aside irrelevant issues

such as whether a "computer program" is patentable and whether there is "novelty", and it applied a sound test for determining the issue of statutory classes of invention under 35 U.S.C. § 101.

The CCPA cannot be charged with systematically and consistently reversing the Board. In some § 101 cases the CCPA has affirmed the Board, while in others it has reversed the Board. These affirmances and reversals are not whimsical or arbitrary; they are based on sound application of sound principles set forth by this Court in *Flook, Benson,* and a long line of cases going back to *Cochrane v. Deener*[20] and *Le Roy v. Tatham.*[21]

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[20] 94 U.S. 780 (1876). The CCPA utilized the principle that "processes" are statutory subject matter. The Supreme Court, in *Cochrane v. Deener* considered a process of manufacturing flour and set forth a definition of the "process" class of patentable subject matter. *Ibid.*, at p. 788. "That a patent can be granted for a process; there can be no doubt," states the Court in *Tilghman v. Proctor,* 102 U.S. 707, 722 (1880). Significantly, the Court there refers to the patentability of the Goodyear process for curing rubber.

The Court further supported the patentability of processes in *O'Reilly v. Morse,* 15 How. 62, (1853), (all claims but one upheld for a process for using electromagnetism to produce telegraphic symbols), *Expanded Metal Co. v. Bradford,* 214 U.S. 366 (1909), (claims involving mechanical manipulation of metal sheets upheld, see p. 385 regarding "processes"), and *Waxham v. Smith,* 294 U.S. 20 (1934), (claims upheld on a process for hatching eggs).

[21] 14 How. 156 (1852). The CCPA also based its decisions on the idea that while a scientific principle is not patentable, the application of such a principle is. In *LeRoy v. Tatham* claims were upheld for a combination of parts of machinery which made pipes and tubes, but the Court said "fundamental truths" were not patentable. *Ibid.*, at p. 175. In *Rubber-Tip Pencil Co. v. Howard,* 20 Wall. 498, at 507 (1874), the Court noted that a new device which makes

The present case is a drastic contrast to *Parker v. Flook*. In *Flook* it was conceded that the *only* novelty lay in a new equation. In the present case the equation is very old and is not in the least novel, but the claimed process involves novel *steps*, including continuously determining the actual temperature at the mold cavity without damaging the precision molded parts. The high frequency of recalculation is also a novel step. More important, the subject matter of each claim *as a whole is novel.*

Novelty, however, is irrelevant to the § 101 issue of whether the invention lies in a statutorily patentable class. Even if novelty *were* at issue, the examiner and the Board have, in effect, admitted that novelty and unobviousness are both present.[22] Moreover, if novelty is now to be made an issue at *this late stage*, respondents should be given an opportunity to present additional evidence.

Finally, since the eleven claims embody the real issues, they should be studied both as a group and individually. When so studied, it will be seen that they claim process of the type declared by § 101 to be patentable.

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an idea practically useful is patentable. An improvement in a paper making machine which utilized the law of gravity was held patentable in *Eibel Process Co. v. Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923). In *Funk Brothers Seed Co. v. Kalo Co.*, 333 U.S. 127 at p. 130, (1948), the Court held that patentable invention comes "from the application of the law of nature to a new and useful end." In *Mackay Radio Co. v. Radio Corp. of America*, 306 U.S. 86 at 94 (1939) this idea was also clearly stated.

[22]The Board can only decide issues presented to it or raised by it specifically under the procedure set up by 37 C.F.R. 1.196(b), and no such new issues were raised.

ARGUMENT

I. WHAT IS THE QUESTION PRESENTED BY THIS CASE?

Before determining the answer to the question presented by this case, the Court should be presented with an accurate statement of that question.

The Commissioner's brief says that the question is:

> "Whether a computer program that regulates the curing time of rubber products in a mold is patentable subject matter under 35 U.S.C. 101".

That is *not* the question presented to this Court. It cannot be. Applicants do not seek to patent *any* computer program. If the Court were to decide that such a computer program is patentable, it would not decide this case. Nor would this case be decided if the Court were to decide that such a computer program is *not* patentable. The question phrased by the Commissioner's brief is irrelevant, and argument on it is purposeless.

The case *does* present eleven claims in a patent application. The PTO Board of Appeals decided that they were directed to non-statutory subject matter, not included in 35 U.S.C. 101. The CCPA reversed and held that the subject matter of all eleven claims defined a *process* within the terms of 35 U.S.C. 101.

The Board of Appeals erroneously said (Pet. App. pp. 24a, 25a), "We think that appellants' contribution, regardless of claim format, is a computer program of the character which the USSC has indicated, in both Flook and Benson, is outside the bounds of 35 U.S.C. 101." The CCPA found that in both *Flook* and *Benson*, the Court held claims

unpatentable because they were for an improved method of calculation or a mathematical formula, not because a computer program was involved. The CCPA also held that the present claims are *not* directed to a mathematical formula or a method of calculation but to a process or method for molding rubber articles.

The Board of Appeals also incorrectly held that each element of the claims was "conventional" except for the calculation steps—and did not seem to notice that applicants had forthrightly stated that the Arrhenius equation was *very* old! Before the CCPA, Diehr and Lutton vigorously contended for the novelty of each claim *as a whole* and for the novelty of measuring the temperature in the mold. However, the CCPA held (correctly) that novelty had nothing to do with patentable subject matter under § 101 and that arguments on that point were irrelevant (Pet. App. p. 13a).

The Supreme Court, in the *Benson* and *Flook* cases, has referred the patentability of computer programs *per se* to Congress, and respondents have no reason for contesting that point.

However, the Supreme Court has also held that mechanical, physical, and chemical processes are patentable subject matter—both before § 101 was enacted and since. As this Court has noted in *Diamond v. Chakrabarty,* 205 US at ....., No. 79-136, June 16, 1980, 48 L.W. 4714 "*Flook* did not announce a new principle that inventions in areas not contemplated by Congress when the patent laws were enacted are unpatentable *per se.*" (Last sentence in IV B of the opinion).

Therefore, respondents submit that the base question presented in this case is:

> Does a patent process claim drawn to subject matter which is otherwise statutory under 35 U.S.C. 101 become non-statutory merely because a computer is involved in execution of a portion of the process?

Phrased more specifically, the question becomes:

> Does a claim to a novel physical and chemical process for molding precision synthetic rubber products—a process normally considered to be patentable subject matter within the terms of 35 U.S.C. § 101—become unpatentable because some of the novel steps used to determine the time when cure is complete and to trigger the opening of the mold at precisely the proper time, involve, *inter alia*, the use of a programmed computer?

II. SOME SUBSIDIARY ISSUES

It will help in answering the main question to consider some subsidiary issues that have readily apparent answers:

1. Is a physical and chemical process for molding precision synthetic rubber products and *not* using a computer a "process" patentable under § 101?

The answer is clearly yes. The Goodyear Patent is a classical example.

2. Are all inventions that *involve* a computer or a computer program unpatentable *per se*?

We believe the answer is no, according to both *Benson* and *Flook*.

3. Are all inventions that *involve* a calculation unpatentable *per se*?

Again, the answer appears to be no, according to *Mackay Radio v. Radio Corp. of America,* 306 U.S. 86 (1939).

III. THE DIEHR-LUTTON RUBBER MOLDING PROCESS WOULD BE DIRECTED TO STATUTORY SUBJECT MATTER UNDER § 101 IF NO COMPUTER WERE INVOLVED.

A process for molding and curing synthetic rubber oil seals and other precision products would normally be considered a "process" of the type stated in 35 U.S.C. 101 as one of the statutory classes of invention. It has been so considered for more than 100 years.[23]

"That a patent can be granted for a process, there can be no doubt," stated the Court in *Tilghman v. Procter,* 102 U.S. 707, 722 (1880). Significantly, the Court referred to the patentability of a process for vulcanizing rubber:

> "Goodyear's patent was for a process, namely, the process of vulcanizing india-rubber by subjecting it to a high degree of heat when mixed with sulphur and mineral salt. The apparatus for performing the process was not patented, and was not material. The patent pointed out how the process could be effected, and that was deemed sufficient."

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[23]In *Diamond v. Chakrabarty,* 205 U.S. ....., 48 L.W. 4714, No. 79-136, June 16, 1980, the Court clearly and sufficiently discusses the historical purposes of the patent law and of § 101; so it is not necessary to reiterate this history in the present case. The Court appropriately notes in *Chakrabarty* that it is the function of Congress to define patentable subject matter, which it did in § 101, but it is the function of the judiciary to construe the boundaries of this definition. *Ibid.*, p. ..... The statutory nature of processes which involve computers is a matter thus best dealt with by the courts. No legislation is needed to determine whether processes like that involved here are appropriate subject matter, for § 101 provides sufficient guidelines.

Processes for molding and curing natural and synthetic rubber have been patented in profusion. Currently, such processes are classified in Class 264 by the PTO and many such process applications are examined and issued as patents every year. The examination is usually done by a *chemical* examining group.

IV. THE USE OF A PROGRAMMED COMPUTER IN AN OTHERWISE STATUTORY PROCESS DOES NOT CONVERT THE WHOLE PROCESS TO NON-STATUTORY SUBJECT MATTER OUTSIDE § 101.

As the CCPA soundly stated in its opinion below (Pet. App. pp. 7a-8a):

> A claim drawn to a process or method does not depend for its validity under 35 U.S.C. 101 on whether a computer is involved. If the claim is drawn to subject matter, *which is otherwise statutory,* it does not become nonstatutory merely because a computer is involved in its execution.

In its more recent decision in *In re Walter*, 618 F.2d 758, 205 USPQ 397, (1980), the CCPA held that the claims there had "no substance apart from the calculations involved. The calculations are the beginning and end of the claims. Thus, this case [In re Walter] falls squarely within the holding in *Flook,* and the claims must be held to be nonstatutory." 618 F.2d 758, 769, 205 USPQ 397 at 409.

In that same decision, the CCPA distinguished *Diehr* from *Walter*[24]:

> This case is also distinguishable from our recent In re Diehr, 602 F.2d 982, 203 USPQ 44 (CCPA

[24]618 F.2d 758, 770, 205 USPQ 397, 410 (CCPA 1980).

> 1979), cert. granted *sub nom.* Diamond v. Diehr, 48 U.S.L.W. 3602 (Mar. 19, 1980). There appellants invented a process for molding synthetic rubber articles in which one physical step of the process, maintaining the blank in the mold for the proper period of time, was improved by refining and further defining the step with the aid of mathematics. The improvement yielded a higher quality product over prior processes which did not keep the blank in the mold for sufficient time or kept it there too long. The equation used in the process remained available for others to use in the rubber-making art as well as other arts; in fact, the equation used had long been in use in rubber-molding processes. The inventors used it to refine a physical step in the process in a manner analogous to the manner in which mathematics and physical laws were employed in the inventions in Mackay Radio[25] and Eibel Process Co.,[26] supra.

In its decision below in *this* [the present] case, the CCPA further said:

> ". . . we do not find either the presence or absence of computer-related recitations in a claim to be of any significance."[27]

Respondents urge that the CCPA is correct.

A. Do the Patent Office Mail Sorters Determine Whether Claims are Patentable?

The practice of arbitrary assignments of patent applications to the various examining groups by the PTO mail

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[25] *Mackay Radio Co. v. Radio Corp. of America*, 306 U.S. 86 (1939).

[26] *Eibel Process Co. v. Minnesota Paper Co.*, 261 U.S. 45 (1923).

[27] Pet. App., p. 14a.

sorters resulted in anomalous treatment of the Diehr and Lutton application.

After the mail has been opened and date-stamped in the Patent and Trademark Office, it is sorted. New patent applications are sent to a special group of intelligent sorters constituting what is termed the Application Division. There, someone reads the claims enough to determine where to send the application for examination. The application is then sent to an "examining group" specializing in the subject matter of that application.[28]

The applications that resulted in the Gould and Davis U.S. Patent No. 3,718,721[29] and in the Davis and Gould U.S. Patent No. 3,649,729[30] both called for methods for curing rubber tires, and both were sent to a chemical examining group. Both inventions used the Arrhenius equation and a programmed computer to determine the length of cure. The chemical examining group was not troubled by the presence of either the computer or the calculations, and the patents were issued.[31]

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[28] See *Manual of Patent Examining Procedure*, Original 4th ed., dated June 1979, U.S. Dept. of Commerce, Patent and Trademark Office, §§ 501, 503, 504, pp. 55, 57, 58.

[29] Issued Feb. 27, 1973, reprinted in part at Pet. App. F, pp. 63a-72a.

[30] Issued March 14, 1972, reprinted in part at Pet. App. G, pp. 73a-80a.

[31] Since Davis and Gould read temperatures by means of a probe actually placed *inside* the tire, their system cannot be used in molding *precision* products. Moreover, they calculated "cure units" only *once per minute*; so their cure data and units were too inaccurate for use in precision products like those involved in this case.

The present application was sent by the Application Division to a *computer* group—an electrical examining group—which does not examine the art of molding and curing synthetic rubber. Apparently, once a case arrives there, it is a computer case. It joins the stack of "computer program cases" referred to in the Petition for Writ of Certiorari in *Diamond v. Bradley*,[32] and therefore is rejected.

In effect, then, a mail sorter in the Application Division decides the patentability of an invention by deciding where to send the patent application. Although the statute should be applied uniformly throughout the Patent and Trademark Office, it is not. By arbitrarily assigning the Diehr and Lutton application to a computer examining group rather than a rubber molding examining group, the mail sorter (in a way) made the initial § 101 determination in this case. The CCPA has corrected this anomaly, and its analysis and application of § 101 deserves affirmance.

B. The Claims are not Directed to a Computer Program.

Diehr and Lutton did not disclose a computer program in the application. The patent application's flow sheets, Figs. 3A and 3B do, however, provide all that a programmer needs to construct a program except for the data base —the rubber cure data, the mold shape and size data, and so on.

The claimed process might possibly be practiced without a digital computer, but the speed and convenience of the computer certainly render the use of a programmed

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[32] No. 79-855. See Bradley Pet., p. 13.

digital computer preferable. Enough is disclosed to make that possible.

However, Diehr and Lutton claimed neither the flow sheets nor a computer program derived from the flow sheets. The claims are for a synthetic rubber molding and curing process *utilizing* a digital computer in claims 1-10.

The language of the claims confirms this assertion. Notice a step such as "constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding" (Claims 1 and 7; similar wording applies to all claims).

Claim 1 also states "initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure." The other claims have similar requirements.

Claim 7 specifically states "installing prepared unmolded synthetic rubber of one said compound in a molding press cavity" and "removing the resultant precision molded article from the press".

Claim 11 contains many non-computer steps including heating the mold.

The key element in each claim is always the mold with its heater. Other equipment is required, including thermostats, an accurate and sensitive thermometer or thermocouple, a timer, and a programmed digital computer. However, computers do not mold rubber. Computers do not measure temperature. Computers, as such, do not measure time.

A computer program will never mold rubber. Federal-Mogul wants precision rubber products, not data for its own sake, not numbers, not a computer program for its own sake. Federal-Mogul's patent attorneys have tried to express that in the eleven claims at issue.

C. Diehr and Lutton Presented Process Claims Rather than Claims to an Algorithm for a Computer.

The Commissioner's brief in *Diamond v. Bradley*[33] says at pages 13 and 14:

> There is an important difference between patenting a novel process and patenting an algorithm for a computer program. With the novel process the inventor seeks to preclude others from actually carrying out the procedures of his invention. *Cochrane v. Deener* 94 U.S. 780, 788 (1876). Nothing in the patent law, however, would prevent others from writing down and passing on the description of his process as long as the process itself was not practiced. But with the algorithm for a computer program the inventor seeks to prevent others from even communicating his new idea by translating his algorithm into a program and loading the program into a computer. In other words, he seeks to patent the idea itself, or at least a form of expressing it.

By that standard there can be no doubt that Diehr and Lutton seek to patent a process, not an algorithm for a computer nor the idea itself.

All that Federal-Mogul wants is a patent which will keep unlicensed persons from making precision-molded synthetic rubber products according to the process. So far as Federal-

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[33] No. 79-855. To be argued in tandem with the instant case.

Mogul is concerned, it only wants what it claims. The claims, if allowed, will not prevent the flow sheets of Figs. 3A and 3B—and also Figs. 1 and 2—from being printed in the newspapers or reprinted by its competitors. The claims leave competitors free to program their computers in accordance with the flow sheets and with the description in the specification—so long as they do not *manufacture rubber products* by the claimed process, for that is all that the claims in issue cover.

When a patent issues, it is printed, and anyone can get a copy for fifty cents and reproduce any or all pages with impunity. They can program their computers by it, and Federal-Mogul would have no right to sue—unless they practice the rubber molding process. Federal-Mogul applied for a patent in order to be in a position where it might receive reasonable royalties from *licensed* users. Such a license is not based on how many copies of the program are printed out, but rather on the practice of the actual process.

V. THE OPINION OF THE COURT OF CUSTOMS AND PATENT APPEALS THOUGHTFULLY AND CORRECTLY APPLIED PRIOR SUPREME COURT DECISIONS, INCLUDING THE BENSON AND FLOOK CASES.

The CCPA has conscientiously followed this Court's decisions in patent cases involving computer-related claims and technology. Respondents have endeavored to survey cases involving computer-related claims and technology which have come before the CCPA and have come up with the following results as of July 1, 1980. Thirty-eight cases

concerning computers were analyzed, which represented all computer CCPA patent cases other than those that went to the Supreme Court for decision. Of these, the scope of patentable subject matter under 35 U.S.C. § 101 was considered in sixteen reported cases, not including the present case or the *Bradley* case, infra. The applicable Supreme Court decisions were considered in every single one of those opinions.[34] Eight decisions affirmed the Board,[35] while eight reversed.[36] A review of those opinions reveals the great pains which the judges of the court below have used

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[34]Some of those opinions were issued before *Flook* was decided, and therefore it was not cited therein.

[35]Cases affirming Board rejections and applying *Flook* and/or *Benson*:

In re Walter, 618 F.2d 758, 205 USPQ 397 (CCPA 1980);
In re Maucorps, 609 F.2d 481, 203 USPQ 812 (CCPA 1979);
In re Gelnovatch, 595 F.2d 32, 201 USPQ 136 (CCPA 1979);
In re Sarkar, 588 F.2d 1330, 200 USPQ 132 (CCPA 1978);
In re Richman, 563 F.2d 1026, 195 USPQ 340 (CCPA 1977);
In re de Castelet, 562 F.2d 1236, 195 USPQ 439 (CCPA 1977);
In re Waldbaum, 559 F.2d 611, 194 USPQ 465 (CCPA 1977);
In re Christensen, 478 F.2d 1392, 178 USPQ 35 (CCPA 1973);

[36]Cases reversing Board rejections and applying *Flook* and/or *Benson*:

In re Sherwood, 613 F.2d 809, 204 USPQ 537 (CCPA 1980), Cert. granted *sub nom Diamond v. Sherwood*, 79-1941;
In re Phillips, 608 F.2d 879, 203 USPQ 971 (CCPA 1979);
In re Johnson, 589 F.2d 1070, 200 USPQ 199 (CCPA 1978);
In re Toma, 575 F.2d 872, 197 USPQ 852 (CCPA 1978);
In re Freeman, 573 F.2d 1237, 197 USPQ 464 (CCPA 1978);
In re Deutsch, 553 F.2d 689, 193 USPQ 645 (CCPA 1977);
In re Chatfield, 545 F.2d 152, 191 USPQ 730 (CCPA 1976), Cert. denied, 434 U.S. 875 (1978);
In re Noll, 545 F.2d 141, 191 USPQ 721 (CCPA 1976), Cert. denied, 434 U.S. 875 (1978).

in analyzing and applying the appropriate cases and principles. The CCPA has steadfastly defended the Supreme Court decisions from seriously flawed misinterpretations advocated by the Board and Petitioner. As the CCPA held in *In re Johnson*, 589 F.2d 1070, 1081 (CCPA 1978) "There is no reason for the Solicitor or the PTO to shortcut the analytical framework set forth in Benson, Flook, and decisions of this court by relying on unfounded generalities."

The CCPA is rewarded by the PTO and the Solicitor General with most unkind criticism and misrepresentations. Thus, the Commissioner's brief in this case says on page 5:

> It [CCPA] held that this Court's analysis detailed in *Flook* was merely "a convenient vehicle" for finding the "method[] of calculation" there to be non-statutory, and did not establish "a general test in determining compliance with § 101" (id. at 13a-14a n.6).

What the CCPA actually said was:

> Although in *Flook* the Supreme Court assumed the equation of the claim to be old in the art even though it was not, the holding of that case does not depend on that mode of analysis. Since Flook's claims were held to be directed to methods of calculation, they were nonstatutory *regardless* of whether the equation was new or old. While the Supreme Court in that case may have found that analysis a convenient vehicle to highlight the fact that Flook's actual contribution to the useful arts was his new formula, we do not believe the Court meant to establish that analysis as a general test in determining compliance with § 101, especially when indiscriminately applied to claim limitations generally.[37]

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[37] Pet. App. A, pp. 13a and 14a, footnote 6.

The distortion by the Commissioner's brief is pointless, since in the present case the Arrhenius equation has always been stated by applicants to be old.

The Solicitor General states in the brief at page 10: "The court below refused, however, to apply *Flook,* summarily dismissing it on the basis that this Court never 'meant to establish that analysis as a general test' (Pet. App. A, 14a n.6)." This misapplication of what the CCPA said is reprehensible. The CCPA spent *pages* reviewing and applying *Parker v. Flook.* In the Appendix to the Petition, the discussion of the *Flook* case by the CCPA takes from page 11a to page 14a and its application extends on to page 17a. In fact, almost *all* of its section entitled "Opinion" is a discussion of *Gottschalk v. Benson* and *Parker v. Flook,* with each case discussed and applied at length.

The Commissioner's brief on page 11 says "The decision below comports with the CCPA's persistent criticism of *Flook* . . . and effectively confines *Flook* to its own facts." This is simply not true, as witness *In re Walter* and other cases cited above in footnote 35.

In the recent petition for writ of certiorari in *Diamond v. Sherwood,*[38] the PTO continues its war with the CCPA saying:

> The Court of Customs and Patent Appeals in the instant case again refused to apply the analysis of patent claims required under *Parker v. Flook* . . .(p. 6)
>
> We have explained in our brief in *Diehr* why we contend that the Court of Customs and Patent Appeals'

[38] *In re Sherwood,* 613 F.2d 809, (CCPA 1980), Cert. granted *sub nom, Diamond v. Sherwood* (79-1941).

> analysis flouts *Parker v. Flook*. That court's refusal to accept governing precedent is repeated in this case. (p. 7)

The CCPA *sometimes*—about half the time—has reversed the Board of Appeals in these computer-related cases because the Board of Appeals has gone too far. The Board has repeatedly found computer programs where none existed. The Board seeks a shibboleth that "computer programs are unpatentable" and it acts on the principles that wherever there is a computer, there is a computer program, and that any invention *utilizing* a computer program or even suggesting the use of a computer program is by that fact alone composed of claims to a computer program.

The Court is invited to look at the CCPA's record—not only at the cases where it held claims to be statutory under § 101, but also at the cases to the contrary. The CCPA does its best to follow the Supreme Court in all cases. It tries to follow intelligently—not to rubber stamp the PTO decisions in § 101 cases.

Respondent believes that the CCPA should be commended—as well as affirmed—for the way it has applied *Parker v. Flook* and *Gottschalk v. Benson* in this case.

VI. THE CCPA'S STANDARDS APPLIED TO THE INSTANT CASE DEMONSTRATE THE PATENTABILITY OF THE CLAIMED PROCESS ON THE BASIS OF PRIOR SUPREME COURT OPINIONS.

The CCPA opinion in *In re Diehr* gives clear insight into the present *modus operandi* of the CCPA in cases involving § 101. When the *Diehr* opinion is coupled with the opinion

in *In re Walter,* 618 F.2d 758, one has both sides of the coin: what the CCPA believes lies within § 101 (Diehr) and without § 101 (Walter).

After disposing of the argument that mere involvement of a computer program is decisive, in *In re Diehr* the CCPA carefully reviewed *Gottschalk v. Benson* and came to the conclusion that in *Benson:*

> [T]he claims were held to be fatally deficient under § 101, *not because a computer program was being claimed, but because a mathematical formula* or algorithm per se was being claimed. . . . [T]he claim would, in effect, dominate all practical and significant uses of the formula. Thus, the Court viewed the claim as directed to the scientific truth itself, rather than to an *application* of, or *structure* created with the aid of, the scientific truth. (Pet. App. A, p. 10a)

On this point it may be noted that Diehr and Lutton make no attempt to prevent anyone from using the Arrhenius equation—even for molding and curing synthetic rubber products. Use of that equation would become patent infringement (if the claims are issued) *only* when the user also constantly monitors the temperatures in the mold at a location closely adjacent (but not in) the mold cavity while the press is closed and *also* uses the temperature data and the equation in substantially continuous recalculation up to the time when the cure is completed and the press opened.

In its Diehr opinion, the CCPA considered *Parker v. Flook* in detail, saying "The Court determined that the claims were essentially directed to the use of a new *mathematical formula* in the conventional process of updating

alarm limits." (Page 11a.) The CCPA noted, *idem,* and quoted the following from *Flook, supra,* p. 545, footnote 18:

> "[O]ur holding today is that a claim for an improved *method of calculation,* even when tied to a specific end use, is unpatentable subject matter under § 101." (Emphasis by the CCPA).

From the *Benson* and *Flook* cases, the CCPA concluded:

> As far as we are concerned, claims may be rejected under § 101 because they attempt to embrace *only* a mathematical formula, mathematical algorithm, or method of calculation, but not merely because they define inventions having something to do with a computer. (Pet. App. p. 12a).

Respondents believe that this position is sound.

The CCPA also held that whether there was novelty in the Diehr and Lutton step of continuously measuring the temperature in the mold cavity was irrelevant to § 101. Respondents agree, while still remarking that this step is, indeed, *one* of the novel portions of the claimed process. Respondents also agree that each claim should be considered as a whole. After all, many processes that have *no* step which is novel in itself are still novel and patentable when all the steps are considered as a whole.[39]

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[39] *Victor Talking Machine Co. v. American Graphophone Co.,* 189 F. 359, at 373, CC SD NY (1911), affd. 190 F. 1023, CA 2 (1911). Deller's Walker on Patents, (Second Edition, Vol. 2, § 110), states: 1) that "a process consisting of a number of steps may be valid even though each of the steps was old." (at p. 203), and 2) "A new combination with a new mode of operation may be invention, even if all the parts thereof are old and even if the function of the combination is also old." (at p. 202).

When the CCPA turned to consider the claims, it correctly remarked that neither the presence nor absence of computer-related recitations in a claim has any significance. The CCPA then noted that the claims do indeed "directly recite a mathematical formula, namely the Arrhenius equation", so that the claims had to "be subjected to further scrutiny." (Pet. App. A, p. 14a). This follows from the CCPA's use of a two-step test to determine whether a claim involving mathematics meets the standard of § 101. This test is based on the CCPA's study of a long series of cases beginning with *Tilghman v. Proctor,* 102 U.S. 707 (1880) and concluding with *Parker v. Flook.* It has been used in a number of CCPA cases including *In re Freeman,* 573 F.2d 1237 (1978) and *In re Johnson,* 589 F.2d 1070 (1978). This test makes sense.

The first step is to determine whether the claims involve mathematical calculations. Since the claims in the present case do involve calculations, the second step must be taken.

The second step is to determine whether the claim recites no more than a mathematical formula or a method of calculation as in *Benson* and *Flook.* If that is *all* that the claim recites, it is outside the statutory classes of inventions recited in § 101.

In this case the CCPA concluded that Diehr's claims did *not* merely relate to calculation. It summed up its view of the Diehr and Lutton claims this way:

> Each of appellant's claims, *as a whole,* recites a process or method for molding rubber articles. They are an improvement over prior processes in that appellants provide for opening the mold at precisely the

> correct time rather than at a time which has been determined by approximation or guesswork. It is this feature of the process that *involves* the Arrhenius equation. The recitation of the equation is not separable from the process in which it is used; it is intimately involved in the process, but the claims are not to the equation. (Pet. App. pp. 15a-16a)

The CCPA then found the Diehr and Lutton claims to be "directly comparable to those involved in *Tilghman v. Proctor*. . . . and *Eibel Process Co. v. Minnesota Paper Co.*" *Ibid.* p. 16a. The claims involve the employment of a scientific truth to a new and useful end without attempting to control the use of the truth itself.

Finally, the CCPA found that the "claims here on appeal are fundamentally different from the claims involved in *Flook*." *Ibid.* p. 17a. In the Diehr and Lutton claims; "the calculation is intimately entwined with the rubber molding process recited." *Idem.* The CCPA said: "It would be a gross distortion to say that the claims . . . are directed essentially to calculations." *Idem.*

The Board of Appeals had sought to consider the claims "regardless of claim format."[40] The CCPA noted that and said that "one would hardly question that a rubber-molding process falls within the § 101 categories of possibly patentable subject matter, and that is what is claimed." (Pet. App. p. 17a)

Respondents ask why particularizing in claims a more precise way of timing the molding cycle should remove the

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[40] Pet. App. C, p. 24a.

claims from the "process" category of § 101. The CCPA saw no reason why and held that it did not.

As noted earlier, the CCPA has commented on *Diehr* in the case of *In re Walter.*[41] See page 23 above. The claims in *In re Walter* were drawn to a method used in seismic prospecting and surveying to unscramble jumbled signals obtained by transmitting and reflecting sound waves through the earth. The unscrambled signals enabled analysis to determine the nature of the subsurface structure of the earth. The CCPA affirmed the PTO and the Board of Appeals by rejecting the claims. It held:

> Examination of each claim demonstrates that each has no substance apart from the calculations involved. The calculations are the beginning and the end of the claims. Thus, this case falls squarely within the holding in *Flook,* and the claims must be held to be non-statutory.[42]

The CCPA's holding and analysis in the *Walter* case show its conscientious effort to apply correctly the rules of law expressed in *Gottschalk v. Benson* and *Parker v. Flook.* It distinguished the Diehr process of molding rubber oil seals from inventions like the Walter process in which the claimed physical result was "described in mathematical terms."

VII. IS THE ARRHENIUS EQUATION THE "ONLY NOVEL FEATURE" IN THE CLAIMS?

This rather absurd question is voiced because the Commissioner's brief at page 7, asserts, "This case is *Flook* revisited." The statement is not true. The present case is

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[41] *Supra,* 618 F.2d 758, 769.

[42] 618 F.2d 758, at 769, 205 USPQ 397, at 409.

distinguished from *Flook* in many ways, as has already been shown.

The claims here are directed to a process for molding and curing synthetic rubber, not to the production of a *number* followed by a "post-solution" step, as in *Flook*. However, the Commissioner attempts to distort the claims and their meaning in order to persuade the Court that novelty is relevant to § 101 and that the claims at issue are devoid of novelty.

The Arrhenius equation is one of the oldest steps in the process. It is not as old as molding itself, but it is quite old. It is *not* a *novel step* in any of the claims, and Diehr and Lutton have never pretended that it is novel.

Novelty is immaterial to the issue of statutory class of invention under § 101, and the CCPA has repeatedly so held. The CCPA has aptly noted that "the word 'new' as used in both § 100(b) and § 101 is defined in § 102 of the statute. The use of the term 'new' in § 101 adds no novelty requirement beyond what is contained in § 102, and § 102 is normally used for novelty rejections." *In re Waldbaum*, 457 F.2d 997, 173 USPQ 430, 434 (CCPA 1972), citing *In re Bergstrom*, 427 F.2d 1394, 166 USPQ 156 (CCPA 1970). The § 101 phrase "new and useful" thus merely helps to tie sections 101 and 102 together and to point out that, in addition to belonging to one of the *classes* of invention which constitute statutory subject matter, the invention must meet the requirement of § 102. Beyond that, § 103 sets forth an entirely different *condition* of non-obviousness which all inventions must also meet in order to be patent-

able; this section 103 should be applied according to the standards set forth in *Graham v. John Deere,* 383 U.S. 1 (1966).

In view of the Commissioner's arguments, however, respondents make the following statements regarding the novelty and obviousness of their invention.

The examiner, in both the original application SN 401,127 and in application SN 472,595 (in which the disclosure is *identical* to the present application SN 602,463) rejected the claims then in the case under § 103 on the basis of prior art.[43] When the applicants argued the point and furnished affidavits in opposition to this ground of rejection, the examiner did not repeat the rejection under § 103.

Under 37 C.F.R. 1.105, "the examiner's action will be complete as to all matters . . ." (Certain exceptions are not pertinent here.) 37 C.F.R. 1.113(b) says:

> In making such final rejection, the examiner shall repeat or state *all* grounds of rejection then considered applicable to the claims in the case, clearly stating the reasons therefor. (Emphasis added).

Thus, under the PTO Rules of Practice, the failure to repeat his rejection under § 103 was a withdrawal of that rejection in view of the argument made by Diehr and Lutton.

The examiner made a final rejection in the second application, S.N. 472,595, on the grounds of § 101 and § 112, but did *not* repeat or restate his prior § 103 rejection.[44] When the case was refiled as a continuation case (the present

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[43] Appendix herein, pp. A-3, A-4 and A-7 to A-9.

[44] *Ibid.*, p. A-16.

case) the examiner rejected the claims under § 101 and § 112 but made no § 103 rejection. Instead, he stated that the references on which he had made his original § 103 rejection were "cited of interest but are not applied against the claims,"[45] making clear that he was not making a § 103 rejection in the continuing application.

In his final rejection in the present case he withdrew the § 112 rejection but repeated his § 101 rejection. He did not refer to § 103.[46]

In the Examiner's Answer to the appellants' brief before the Board of Appeals, the examiner stated: *"No references have been relied on."*[47]

The most logical and likely conclusion from the file histories of these Diehr and Lutton applications is that the examiner believed that the claims meet the tests of novelty and of obviousness in §§ 102 and 103. This is the normal and only proper reason for not repeating a rejection under prior art.

The alternative conclusions would be that the examiner was extraordinarily careless or that he deliberately neglected his duty and disobeyed the Rules of Practice. Since the file history evidences great care on his part as to most aspects of the case and since he had at least *three* opportunities to correct mistakes and oversights, these alternative conclusions are completely untenable.

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[45] See Pet. App., p. 29a.

[46] *Ibid.*, p. 31a-37a.

[47] Appendix herein, p. 18a.

It is clear that the examiner settled the matters of novelty and obviousness in favor of the inventors.

However, because the Solicitor's brief has raised the issues of novelty and obviousness, a few additional points should be discussed. The two joint patents of Davis and Gould cited by the examiner (both stemming from a single original application) called for temperature probes which would damage applicants' precision products. Further, the calculation using the Arrhenius equation was performed only once per minute. This would do little good in a cure time of about 2 to 2½ minutes, as in the Federal-Mogul process as practiced. It is clear that applicants' frequent recalculations and use of the temperature probe where it could not damage the product were both novel and unobvious at the time the invention was made to people experienced in that mold art. Though novelty should be held to be immaterial since the case involved only § 101, there *is* novelty more than sufficient to overcome the Commissioner's arguments.

Moreover, if the Court believes the issues of novelty or obviousness are material, respondents at *some* stage of the proceedings should be entitled to produce additional evidence on these issues.

The Board based its conclusions regarding conventionality of the claims on three faulty premises: (1) dissecting the claims to look for novelty in particular steps, rather than viewing each claim as a whole, (2) confusing a thermocouple with a thermostat and construing the statement in the specification that thermostats had been used to hold molding temperatures within a certain range to mean con-

stantly determining the *exact* temperature, a novel feature not conceded to be old and in fact not old, and (3) failing to note that repetitive recalculation at very short intervals is also new. Constant recalculations along with continuous determinations of the actual temperatures, is the key feature here, not the equation or the fact of calculation.

The argument that the invention as claimed is old is both immaterial to the § 101 analysis at issue and incorrect in view of the facts and file history.

VIII. THE CLAIMS DIFFER FROM EACH OTHER AND THEREFORE MERIT SEPARATE CONSIDERATION.

There are important differences between the claims.[48] While these differences should not affect the § 101 issue, an understanding of the differences is helpful to an understanding of the claims at issue.

In all claims the key operation is molding, not calculating. The product is a molded and accurately cured precision product, not a number. Molding, timing, and constantly measuring the temperature are all physical steps involving no calculating. The calculating which is then used is only part of the process, yet *repetitive* calculation and comparison greatly improve the molding process.

Claim 1 is broad and states the fewest steps. It clearly defines its general nature in its preamble: "A method of operating a rubber-molding press for precision molded compounds with aid of a digital computer." It calls for a

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[48]The claims are reproduced at Pet. App., pp. 57a-62a.

step of providing the computer with its data base; this data base depends on characteristics of the compound being molded, the particular batch of that compound, and the geometry of the portion molded.

Claim 1 calls for "initiating an interval timer" when the press is closed, and calls for "constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding". It calls for "constantly providing the computer with the temperature (Z)". It then calls for "repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation. . . ." It also calls for "repetitively comparing in the computer at said frequent intervals . . ." the total cure time calculated from the Arrhenius equation with the elapsed time. Finally it calls for "opening the press automatically when" the "comparison indicates equivalence."

Claim 2 adds the taking of an important physical measurement to claim 1. A rheometer (not a part of a computer) is used to measure what is known as the activation energy content of the very batch of material being molded.

Claim 3 adds a different feature to claim 1—that of controlling the mold *heater* in accordance with the actually observed temperatures to keep the mold temperature within a calculated temperature range.

Claim 4 depends from claim 3 and adds that the frequent periodic interval for calculating that range is about 10 seconds.

Claim 5 is an important claim in independent form. It calls for operating a *plurality* of rubber molding presses

simultaneously. One computer can be used for many such presses—fifty or more. Each press can start and operate completely separately, but all presses are connected to a single computer that controls the cure times according to the temperatures read at each press. This very novel process is quite important. In other respects, claim 5 is much like claim 1.

Claim 6 depends from claim 5 and requires the frequency of repetitive recalculation and comparison to be once per second or faster.

Claim 7 adds specific statements of some of the necessary physical steps, previously only implied by the claims, such as "installing prepared unmolded synthetic rubber of one said compound in a molding press cavity", closing the press, and "removing the resulting precision molded article from the press". The claim was added to make it clearer that the process is one in which the synthetic rubber is changed both mechanically and chemically and emerges as a quite different product.

Claims 8-10 depend from claim 7 and are basically the same as claims 2-4 except for their dependency on claim 7 instead of claim 1.

Claim 11 does not even mention the use of a computer, and it is still more explicit as to the physical steps. It does, of course, include the steps of repetitive frequent recalculation and repetitive comparison for each recalculation. Those two steps are the only calculation and the only comparison steps out of a total of ten stated steps.

None of the claims relies on any single step for its novelty. Calculation using the Arrhenius equation is certainly old. *Frequent* recalculation (as distinguished from recalculating only once per minute, for example) is new. So is the step of constantly determining the temperature at the stated location (so as not to destroy or damage the product). But the novelty and patentability lie in *each* claim considered *as a whole,* not in particular steps. Moreover, § 101 is properly applied only to each claim as a whole, not to one or two elements thereof.

IX. CONSIDERATION OF EACH CLAIM AS A WHOLE SHOWS THEM ALL TO FALL IN THE CLASSIC CATEGORY OF "PROCESS" AS THE TERM IS USED IN 35 U.S.C. 101.

Since the claims do use the Arrhenius equation, a key point to be decided is whether each claim, considered as a whole, is drawn to a limited, specific, and practical application of the principle to produce a beneficial result or effect in one of the technological arts.

The Arrhenius equation is admittedly old and well-known in the rubber molding art. It has long been used for calculating the curing time for rubber compounds. Although each time the computer solves the Arrhenius equation, a number is obtained; unlike *Flook,* that number is not the end product of the claim. Rather, this number is then compared to the elapsed time since the mold was closed to determine if they are the same. As long as they are not the same, the process continues to monitor the temperature and to calculate the solution to the Arrhenius equation at each temperature reading. There can be no question but

that the principle of nature embodied in the Arrhenius equation is *used* within the claim such that the claim, in its entirety, is drawn to a specific, limited and practical *application* of the principle to achieve a beneficial result in one of the technological arts. The claim is not drawn to the principle.

Thus, although a principle of nature is recited in the claim, the claim as a whole is not drawn to that principle, but constitutes a use of the principle in a novel way to a practical, beneficial end. Therefore, each claim of Diehr defines patentable subject matter within the meaning of § 101.

The applicants here are not claiming "computer programs". If they were, their application would clearly be deficient since a computer program is not disclosed in the application, even though anyone of ordinary skill in the programming art can produce usable computer programs from the functional flow diagrams disclosed in their application.

Nor are they attempting to use the draftsman's skills to "word" a claim to appear as if it is drawn to something else when it in fact covers nothing but a computer program. Diehr and Lutton claim a method for molding rubber articles which *requires the use of a programmed computer* in implementing several of the method steps.

If the claimed invention is considered in its entirety, it is clear that no "principle" will be preempted by any patent which may issue with these claims. Rather, what will be patented will be a very practical, very beneficial molding

process involving the use of programmed data processors to produce desirable results in a technological art.[49]

The disclosure of these types of inventions is precisely what our patent system was intended to encourage.

CONCLUSION

Since the invention as claimed relates to a process of the type defined as patentable under 35 U.S.C. 101, whether or not a computer is utilized in practice of the invention, the decision below should be affirmed.

August 6, 1980

Respectfully submitted,

ROBERT E. WICKERSHAM
OWEN, WICKERSHAM &
ERICKSON P.C.

Attorneys

Of Counsel,
ROBERT F. HESS
JAY M. CANTOR
THOMAS M. FREIBURGER
ROBERTA L. CAIRNEY
DAVID A. LOWIN

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[49] This viewpoint would certainly be consistent with *Diamond v. Chakrabarty, supra* footnote 23.

APPENDIX A

Claims as Submitted in Original Application S.N. 401,127 Filed September 26, 1973

1. A method of operating a rubber-molding press with the aid of a digital computer, comprising:

providing a computer with time-temperature cure data for the compound being molded in the press,

initiating an interval timer upon closure of the press,

determining the temperature of the mold cavity in the press at every instant during molding,

keeping the computer informed as to the temperature of the mold cavity,

integrating in the computer, the mold-cavity temperature with time during the cure,

comparing in the computer at frequent intervals during the cure the time-temperature integration, the elapsed time, and the time-temperature cure data, and

opening the press automatically when the comparisons indicate completion of cure.

2. A method of operating a series of rubber-molding presses in conjunction with a computer, comprising:

providing the computer with time-temperature cure data for the compounds to be molded,

informing the computer the compound being molded in each press,

measuring the cure rate of the compound for each press with a rheometer,

informing the computer about the rheometer characteristics for each compound,

constantly monitoring the temperature of each mold cavity,

informing the computer about every ten seconds in serial fashion the temperature for each said press,

integrating in the computer serially at a period of about every ten seconds the time-temperature conditions in each press,

comparing in the computer, after each said integration, the integral with the elapsed time for that press and the time-temperature data therefor, and

opening each press automatically when the comparing step indicates completion of cure for that press.

APPENDIX B

Excerpt of Patent Office Rejection of January 24, 1974 (Original Application, S.N. 401,127)

Notification of Rejection(s) and/or Objection(s) (35 U.S.C. 132)

Claims	Reasons for Rejection	References	Information Identification and Comment
1 and 2	35 U.S.C. 102		Drawn to insufficient disclosure see Part IV, par. 1
2	35 U.S.C. 112		vague and indefinite—the phrase "the computer the compound" in line 22 of claim 2 is confusing.
1 and 2	35 U.S.C. 103	A	A discloses a computer control of a molding process. Variables such as time and temperature are sensed and are fed to a programmed computer which compares such values with pre-stored values. As noted in col. 4, line 60—the time for opening the tire mold is indicated by a signal on line 70.
1 and 2	35 U.S.C. 101	A	Drawn to non-statutory subject matter. The basic concept of computer control of a rubber-mold press is disclosed by A. Any novelty in the claim, therefore must be based on the particular calculations performed by the computer according to a prescribed program. Such has been held to be non-statutory subject matter in Gottschalk v. Benson, 175 U.S.P.Q. 673.

B-D are cited of interest, but are not applied against the claims.

Part IV

1. The specification is objected to as containing insufficient disclosure under 35 U.S.C. 112 to support the appended claims. The brief description of the operation of the digital computer on page 7, line 1-11 is inadequate to comply with the requirements of the statute. Further, a digital computer by itself would be incapable of carrying out any operation until its sequence of internal interconnections has been added thereto by the preparation and loading of a program into the internal memory of the computer. The instant disclosure does not identify the program or programs needed to cause the computer to carry out the wanted functions.

Notice of References Cited

	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date If Appropriate
A	3,659,974	5-1972	Neugroschl	264	40X	
B	3,579,626	5-1971	Brittain	264	315X	
C	3,649,729	3-1972	Davis et al	264	40	
D	3,718,721	2-1973	Gould et al	264	40	1-26-1970

APPENDIX C

Claims as Submitted in Continuation-in-Part Application S.N. 472,595, Filed May 23, 1974

1. A method of operating a rubber-molding press with the aid of a digital computer, comprising:

providing a computer with time-temperature cure data for the compound being molded in the press,

initiating an interval timer upon closure of the press,

determining the temperature of the mold cavity in the press at every instant during molding,

keeping the computer informed as to the temperature of the mold cavity,

calculating in the computer, the Arrhenius equation for reaction time during the cure, which is $\ln v = CZ + x$ where

$\ln v$ is the natural logarithm of the total required cure time,

C is the activation energy constant unique to each batch of compound being molded,

Z is the present temperature of the mold, and

x is a constant dependent upon the geometry of the particular mold of the press,

comparing in the computer at frequent intervals during the cure the total required cure time calculated with the Arrhenius equation and the elapsed time, and

opening the press automatically when the comparison indicates completion of cure.

2. The method of claim 1 including measuring the time-temperature cure data for the compound being molded in the press with a rheometer and automatically updating said data within the computer in the event of changes in the compound being molded in each press as measured by said rheometer.

3. The method of claim 1 including providing the computer with a mold temperature set point for each mold and a constant of proportionality with which a range of permissible mold temperature variation may be calculated, calculating at frequent periodic intervals in the computer the range of mold temperature variations from the set point, comparing at frequent periodic intervals in the computer the range of mold temperatures and the actual temperature, and controlling the mold heater to keep the mold temperature within the calculated range of the set point.

4. The method of claim 3 wherein the frequent periodic interval is approximately 10 seconds.

5. A method of operating a series of rubber-molding presses in conjunction with a computer, comprising:

providing the computer with time-temperature cure data for the compounds to be molded,

constantly informing the computer of the temperature of each mold,

informing the computer of the compound being molded in each mold,

constantly informing the computer of the elapsed time that the compound has been in each mold,

calculating at frequent periodic intervals in the computer the Arrhenius equation to determine the total required cure time,

comparing at frequent periodic intervals in the computer the calculated total required cure time and the elapsed time, and

opening the press automatically when the elapsed time has reached the calculated total required cure time.

APPENDIX D

Excerpts from Patent Office Rejection of December 17, 1974 (Second Application, S.N. 472,595)

Notification of Rejection(s) and/or Objection(s) (35 U.S.C. 132)

Claims	Reasons for Rejection	References	Information Identification and Comment
1-5	35 U.S.C. 112		drawn to insufficient disclosure. See PART IV, paragraph 1.
1-5	35 U.S.C. 103	AvB	A discloses a computer control of a molding process in which variables such as time and temperature are sensed and are fed to a programmed computer which compares such values with pre-stored values. As noted in col. 4, line 60—the time for opening the tire mold is indicated by a signal on line 70. B discloses a method of controlling the curing of curable articles in which the Arrhenius equation is used to calculate the relationship between the temperature and the rate of reaction. It would be obvious to use such equation for calculation in the device of A in view of B.
1-5	35 U.S.C. 103	C	C discloses an apparatus for controlling the cure of a rubber compound in which rheometric data is used to calculate the indication time period by using the Arrhenius equation which value in turn, is compared with a predetermined stored value.

Claims	Reasons for Rejection	References	Information Identification and Comment
1-5	35 U.S.C. 101 & 103	A	drawn to non-statutory subject matter. The basic concept of computer control of a rubber mold press is disclosed by A. Any novelty in claim, therefore must be based on the particular calculations performed by the computer according to a prescribed program. Such has been held to be non-statutory subject matter in Gottschalk v. Benson, 175 USPQ 673.

D and E are cited of interest but are not applied against the claims.

PART IV

1. The specification is objected to by the Examiner as containing insufficient disclosure under 35 USC 112. The instant invention is disclosed and claimed to be one involving a general purpose digital computer properly programmed to calculate the correct cure time for a rubber-molding press and to open such press accordingly. A general purpose computer by itself would be incapable of carrying out any operation until its sequence of internal interconnections has been added thereto by the preparation and loading of a program into the internal memory of the computer. The instant disclosure does not identify any program which will cause the computer to carry out the necessary functions. Although applicant has provided a flow chart, it is noted that such flow chart is not a program and only suggest [sic] operations from the point of view of desired results. The type of flow chart in the instant

application is not detailed enough to place an operative program within the hands of those skilled in the art. In some cases a flow chart may be sufficiently detailed to satisfy the disclosure requirements of section 112, but this case is not one of them.

Notice of References Cited

	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date If Appropriate
A	3,659,974	5-1972	Neugroschl	264	40 X	
B	3,718,721	2-1973	Gould et al	264	40	
C	3,819,915	6-1974	Smith	235	151 X	9-17-1973
D	3,579,626	5-1971	Brittain	264	315 X	
E	3,649,729	3-1972	Davis et al	264	40	

APPENDIX E

Excerpt from Amendment to Second Application S.N. 472,595, Filed March 13, 1975

Part III, Paragraph 2

The second basis of rejection is made under Section 103 on the basis of Neugroschl in view of Gould et al.

The Examiner commented that Neugroschl disclosed a computer control of a molding process. However, a careful review of Neugroschl establishes that the computer disclosed therein provides *no control of the molding press whatsoever.* In fact, the Neugroschl tire press 1 is controlled by conventional electromechanical circuitry located in a control cabinet 30:

> "A typical controller consists of the well known timer cam in which a number of cams are mounted on an extended shaft which is turned at a constant rate. A cycle of the press and post cure inflator is con-

trolled by one full turn of the timer shaft. Cams on the shaft contact switches to operate the various press and inflator functions."

(Neugroschl, Col. 3, l. 19-24)

"Initiation of a cure cycle is accomplished by closing contacts 45 which turns on timer motor 47. During the time motor 47 operates, *which is the length of a cure cycle,* voltage is applied to the primary side of transformer 51 by lines 52, 53."

(Neugroschl, Col.3, l. 75-Col. 4, l. 4, emphasis added)

It is to be noted in Fig. 3 of Neugroschl that all of the control signals that operate the press 1 originate on the primary side of the transformers, including transformer 70, which was incorrectly cited by the Examiner as the computer control element. Fig. 3 fails to disclose any computer input to the primary side of any of the transformers. Thus, Neugroschl does not disclose and does not suggest the use of the computer to control either the timer motor 47 or any other controlling circuitry of the press. Since the patent to Neugroschl does not disclose or suggest the computer control of the present invention, its combination with the patent to Gould et al. would not produce the present invention or make the method thereof obvious.

Gould et al. taught three ways to calculate the cure time for curable articles, particularly rubber tires. The first way suggested was a numerical integration of an Arrhenius equation. (Gould, col. 2, lines 5-24). A second way was to utilize an empirical equation which differs from the present invention. (Gould, Col. 2, lines 25-29). A third way was an unspecified polynomial equation expressing the relationship between the change of properties with temperature and time (Gould, Col. 2, lines 37-39).

Although Gould mentions on [sic] passing the use of a digital computer to perform a summation of "increments of cure," his suggestion is most vague, as no details of any sort are given. (See Col. 2, lines 64-67) In fact, a careful review of the Gould et al. reference reveals it was directed to an invention quite different from the present invention. Gould et al. were concerned with certain tire curing situations allowing the insertion of a thermocouple probe directly into a tire undergoing cure in the press. Apparently, Gould et al. felt that in the cure of articles of the size and relative crudeness of tires, the deformities of the tires caused by insertion of the thermocouple was offset by a claimed increased accuracy of temperature readings. The Gould method is entirely unworkable in curing "precision molded compounds" which are the workpieces of the method of the present invention, and applicants' claims exclude Gould's use of a probe that projects into the article, calling for "constantly determining the temperature (Z) of the mold at a location closely adjacent to mold cavity."

Gould is further distinguished in that Gould relied on an analog computer to calculate cure in terms of "cure units," each cure unit being defined as the cure obtained at a given temperature for *one minute* (Gould, claim 1). The present invention provides a much more accurate calculation of cure time by *repeatedly recalculating* the Arrhenius equation "at frequent intervals during each cure" (See applicants' claim 1). As is well known in the art, modern computers are able to calculate a program cycle of the types specified by Fig. 3 of the present invention in an amount of time typically in the order of one second (See

applicants' claim 6). Thus, the present invention further patentably distinguishes over Gould.

Part III, Pargraph 3

The third basis of rejection was made under 35 U.S.C. 103 on the basis of Smith. This third reference discloses programmed digital apparatus (in block diagram only) for calculating cure time for the purpose of terminating the cure of a curable article, such as a tire. In a complex and confusing fashion, the Smith invention divided a cure cycle into an induction-reaction period wherein there is no change in mechanical property of the rubber, and a cross-linking reaction period wherein cross-linking of the molded material occurs. The present invention vastly simplifies the complex method of Smith by combining the induction reaction with the cross-linking to provide the digital computer with but one calculation to perform during each calculation cycle, there being many such cycles during the cure. The improved method of the present invention enables the digital computer to aid the control of one or numerous presses simultaneously, whereas the limited purpose block diagram apparatus of the Smith reference is clearly limited to only one press. The Smith invention is quite different from applicants'.

In addition to the foregoing reasons distinguishing applicants' invention from the Smith patent, applicants are filing herewith a Rule 131 affidavit and exhibits by which they establish a conception and reduction to practice of their invention before the effective filing date of the Smith application, being September 1, 1973. In filing the affidavit

under Rule 131, applicants do not admit or imply that the Smith reference, either alone or in combination with other art of record herein, renders their invention unpatentable. Applicants have the earlier date, and therefore are filing the affidavit anyway.

Part III, Paragraph 4

Claims 1-5 are also rejected under Sections 101 and 103 as drawn to non-statutory subject matter. The Examiner reasoned that sinced computer control of a rubber mold press was disclosed by Neugroschl, any novelty of the present invention would be in the algorithm manipulated by the computer. As explained above, Neugroschl does not disclose or suggest computer *control* of a rubber mold press, and thus a basic premise of the Examiner is erroneous. Furthermore, the present invention clearly defines a novel and unobvious method calling for steps in addition to calculation with an algorithm. For instance, claim 1 calls for "intiating an interval timer," "constantly determining the temperature Z," "*repetitively* calculating in the computer, at frequent intervals during each cure, the Arrhenius equation . . . ," and "repetitively comparing . . . each said calculation . . . and said elapsed time" to determine equivalence to open the press. These elements are not the abstract mathematical formula considered in the cited *Gottschalk v. Benson* opinion. Rather, the claims presented herein clearly define a patentable process, being one category of invention expressly enumerated in Section 101. The rejection on this ground is thought to be traversed.

Allowability of Claims

The claims of the present invention, as amended, are thought to define patentable subject matter and will now be considered. Claim 1 is expressly directed to "precision molded compounds" which cannot be distorted by, e.g., the Gould et al. method, which calls for insertion of the thermocouple into the compound. "Repetitive" computer calculations and "repetitive" comparisons synchronized with the calculations are now expressly claimed in claim 1. As now claimed, the applicants' method provides a very efficient control for the press, far more efficient than either the analog routine of Gould or the complex routine of Smith. And, as stated above, Neugroschl has no real pertinence to any of the claims because it is not a computer control invention.

Claim 6 has been added to follow claim 1. This dependent claim specifies that each calculation and comparison interval will "be no longer than approximately one second," which thereby makes it about sixty times faster than the Gould analog computer calculates its cure unit.

Claim 2 has been amended to specify that the rheometer automatically updates the computer "data base" with the "activation energy constant" of the compound undergoing molding. This is an *on line* update, rather than the manually inserted rheometric data of Smith.

Claims 3 and 4 have not been amended. They depend from claim 1 which is now thought to define patentable subject matter, and thus they are thought allowable.

Claim 5 has been amended to cover a "method of operating a plurality of rubber-molding presses simultaneously

curing precision molded compounds in conjunction with a computer . . ." Thus, for the same reasons applicable to claim 1, claim 5 patently distinguishes over the cited prior art. Indeed, claim 5 is vastly different than any of the methods of the references, which limit the computer to one press. In claim 5 the computer is "repetitively calculating" and "repetitively comparing . . . for each said press," as the presses simultaneously cure the precision molded compounds.

With this response, applicants sincerely believe this case in condition for allowance. Therefore, reexamination and reconsideration is respectfully requested.

The Examiner is invited to telephone applicants' attorney at the number below his signature, if such a call would further the prosecution of this matter.

APPENDIX F

Excerpt from Present Continuation Application S.N. 602,463 Filed August 6, 1975

These Remarks respond inter alia to the Final Rejection of the Examiner dated May 14, 1975 of the parent application, Serial No. 472,595. * * * The Examiner did not in that action reject claims 1-6 on prior art under either 35 U.S.C. 102 or 35 U.S.C. 103. Applicants infer that the Examiner has now recognized the unobvious differences of the present invention over the cited prior art and that the issue is to Sections 101 and 112.

APPENDIX G

Excerpt of Joseph D. Ekland's 2nd Affidavit Submitted with the Amendment, Filed April 21, 1976 in the present application S.N. 602,463

I, Joseph D. Ekland, being first duly sworn, depose and say: • • •

8. That the system as installed at the Van Wert, Ohio facility is considered an economic success in that Federal-Mogul Corporation has publically claimed a 20% increase in product and a 15% reduction in scrap rate.

APPENDIX H

Excerpt from Brief for PTO Board of Appeals, October 21, 1976

ARGUMENT

Although there was a rejection on art in the parent case, this rejection was withdrawn. There was also a rejection even in this continuation case, under § 112—that, too, has been withdrawn. The rejection now is § 101 alone.

APPENDIX I

Excerpt from Examiner's Answer, February 23, 1977

Description of the Invention

The invention is described on page 8 through 19 of appellants' brief.

No References Have Been Relied On

The Grounds of Final Rejection

Claims 1-11 are rejected under 35 U.S.C. 101 as being drawn to non-statutory subject matter.